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Trichodina pediculus (O.F. Müller, 1786) Ehrenberg, 1838 et *Trichodina domerguei* (Wallengren, 1897)

In studies on *Urceolariidae*, and above all in research on taxonomy and comparative morphology of representatives of the genus *Trichodina*, main difficulties and most confusion are entailed by inadequate separation of two species: *Trichodina pediculus* (O. F. Müller, 1786) Ehrenberg, 1838, and *Trichodina domerguei* (Wallengren, 1897).

Trichodina pediculus was described as *Cyclidium pediculus* by O.F. Müller, 1786, from a *Hydra* sp., redescribed, also from a *Hydra* sp., by Ehrenberg, 1838, and examined in greater detail from *Hydra fusca* and *H. viridis* by James-Clark, 1866. However, subsequent data on *T. pediculus*, by Quennerstedt, 1869, as well as Wallengren, 1897 (Biol. Zentrbl.), were based on material from fishes, until Wallengren, 1897 (Acta Un. Lund.) separated forms from fishes as *Cyclochaeta domerguei*. However, largely owing to inadequacy of the characters quoted by Wallengren ("cirri"), numerous subsequent authors — unable to note essential differences between the *Trichodina* they investigated from fishes, and descriptions of *T. pediculus* — treated forms from fishes as *T. pediculus*, occasionally considering *T. domerguei* as a synonym of *T. pediculus*. This viewpoint was expressed, among others, by Mueller, 1937, Raabe, 1950, and Stryjecka-Trembaczowska, 1953.

The only descriptions of *T. pediculus* from *Hydra*, more recent than those by James-Clark, were given by Zick, 1928, Wetzel, 1927, and Šramek-Hušek, 1953, and the photographic material —also relating to parasites of *Hydra* — of Canella, 1954. Unfortunately, the descriptions are entirely inadequate: Wetzel's drawings are altogether fantastic and correspond nei-

ther to *T. pediculus* nor even to any representative of *Urceolariidae;* neither Zick, nor Wetzel or Šramek-Hušek, supplied an adequate differential analysis — Zick even reported *T. pediculus* from *Anura* tadpoles, which suggests that the may have treated the two species jointly — whereas Canella gave no description at all.

Trichodina domerguei was described in Wallengren's second report from 1897 as *Cyclochaeta domerguei* from the skin and gills of several species of fishes listed in the following order: *Pygosteus pungitius, Gasterosteus aculeatus, Carassius vulgaris, Phoxinus aphya* and *Leuciscus delineatus.* Wallengren reckoned his species in the genus *Cyclochaeta* since he found it to have (unlike *T. pediculus*, which he did not even examine!) a girdle of "cirri" surrounding the aboral ciliary girdle. However, since these "cirri" have not been noted in such a distinct form by anybody else, and the described second girdle of sparser cilia, present in many *Urceolariidae* species, could not always be distinguished, it was agreed to transfer the species *C. domerguei* Wall. to the genus *Trichodina.* Nevertheless, numerous more recent authors who were unable to find those "cirri", placed the forms they found in *T. pediculus*, or erected new species for them. After Wallengren, there have been numerous authors who referred to *T. domerguei*: Precht, 1935, quotes it for many species of fishes; numerous forms, from marine and fresh-water fishes, are separated within the species by Dogiel, 1940, who described among others *T. domerguei* f. *latispina* from *Pygosteus pungitius*; Stryjecka-Trembaczowska, 1953 described numerous forms from Baltic fishes, quoting also *T. "pediculus"* f. *latispina* from *Gasterosteus, Pygosteus* and *Nerophis.*

On the other hand, numerous authors describe at the same time new species of the genus *Trichodina* from the skin and gills of fishes, generally without analysing their relation to *T. domerguei* (Wall.). Of the species thus described, a great number seems to correspond to the apparently much differentiated species *T. domerguei* (Wall.), as do, for instance, some forms of *T. branchicola* Tripathi, 1948, and their like. In result, there have been described from the gills and skin of fishes 43 species, frequently of indefinite relation to *T. domerguei* (Wall.), and numerous forms of the latter species specific for various species of fishes and different habitats.

The confusion due to absence of a clear distinction between *T. pediculus* (O.F. Müller) Ehrbg. and *T. domerguei* (Wall.) has been aggravated still further by various authors quoting representatives of the genus *Trichodina* from the skin and gills of tadpoles of various *Amphibia*, because — unlike various forms of *Trichodina* from the urinary bladder of *Amphibia*, usually described in independent but coinciding reports as new species (except for earlier authors before Fulton, 1923) — they usually treated the forms from the skin of tadpoles as either *T. domerguei* (Wall.) or as *T. pediculus* (O. F. Müller) Ehrbg. (e.g., Zick, 1928). Identity of the parasites from the skin of tadpoles with those from *Hydra* was supposed to be supported by the possibility — established by Rosseter, 1886 — of transferring the former onto these *Coelenterata*, whereas *Trichodina* from the urinary bladder of adult *Triturus* cannot be transferred. Even recently, Canella, 1954, reported from gills of tadpoles of *Rana esculenta* and *Hyla arborea* the new species *T. dilleri*, however, without a description or more detailed reproductions: consequently, the species *T. dilleri* Canella, 1954, has to be treated as a nomen nudum. Canella's photographs (Phots. 51, 200, 201) appear to suggest that he was dealing rather with a form corresponding to *T. domerguei*, shown on his other photographs. None of the authors dealing with *Trichodina* from the gills and skin of tadpoles concerned himself with comparing them in more detail with *T. pediculus* (O. F. Müller) Ehrbg. or *T. domerguei* (Wall.).

Intending to analyse the differences between *T. pediculus* (O. F. Müller) Ehrbg. and *T. domerguei* (Wall.), I thought it indispensable to consider *Trichodina* from hosts typical for both species and to compare them parallel and comparatively by identical methods. In addition to iron haematoxylin staining, I applied silver-nitrate dry impregnation after B. Klein, which has been most useful in my earlier investigations. As typical hosts of *T. pediculus* (O. F. M.) Ehrbg. I took fresh-water *Hydrida* from the genera *Hydra* and *Pelmatohydra*, since the parasites have been described from "hydrae" by O. F. Müller and Ehrenberg; the material I had in hand came from *Pelmatohydra oligactis* from the environments of Warszawa. As hosts typical for *T. domerguei* (Wall.) one has to assume the fishes quoted by Wallengren. However, since the form occurring on the gills of, e.g., *Carassius*, is somewhat different from that found on the gills of *Gasteroste-*

idae, I assumed as hosts of the typical form of *T. domerguei* (W a l l.) — *Pygosteus pungitius* and *Gasterosteus aculeatus*, mentioned by W a l l e n g r e n in the first place. I found in either species the same form of *Trichodina*, corresponding to *T. domerguei* f. *latispina* described by D o g i e l in 1940 and subsequently reported by S t r y j e c k a - T r e m b a c z o w s k a, 1953 from the gills of *Gasterosteus aculeatus*, *Pygosteus pungitius* and *Nerophis ophidion*, from the Baltic. My ample material was obtained from *Gasterosteus aculeatus* from fresh-water in the environments of Lublin and Warszawa, and from the brackish waters of the Gdańsk and Puck bays.

The investigations revealed unexpectedly conspicuous and distinct differences between *T. pediculus* (O. F. M.) E h r b g. from Hydras and *T. domerguei* (W a l l.) from the species of fishes referred to before. The differences involve primarily the adhesive disk and the denticulate ring. *T. pediculus* (O. F.M.) E h r b g. proved to differ very notably not only from *T. domerguei* (W a l l.) from the fishes examined, and from other forms of the species, but also from the other *Trichodina* species known to me. On the other hand, examination of *Trichodina* from the skin and gills of tadpoles of *Anura* (*Rana*, *Bufo*) enabled me to establish unexpected identity of the parasites with *T. domerguei* (W a l l.), and even with the most typical form occurring on *Gasterosteidae*.

Settling of the distinction between *T. pediculus* (O. F. M.) E h r b g. and *T. domerguei* (W a l l.) should — I believe — help to clear up confusion as to the possible synonimity of the two species and encourage more precise diagnoses of new forms. With this purpose in mind, I wish to present characteristics of the typical forms of the two species.

Trichodina pediculus (O. F. M ü l l e r, 1786) E h r e n b e r g, 1838

Urceolariidae cylindrical in shape, frequently with a median hour-glass type constriction. Diameter: 35—60 μ; height: 25—55 μ. Adoral spiral complete, describes an arc of slightly more than 360° (roughly 400°) and 35—45 μ in diameter, and leads to the peristomal infundibulum. Nuclear apparatus: macronucleus sausage-like, frequently irregular in thickness and terminally pointed, describes an arc of roughly 300° and ± 16 μ in diameter; micronucleus is located near one of the ends of macronucleus.

Adhesive disk provided with a denticulate ring consisting of denticles with short, strongly curbed and pointed extrorse hooks and very long introrse spikes (rays) extending almost to the middle of the adhesive disk. In iron-haematoxylin stained preparations the spikes appear very slender and delicate; in silver-nitrate impregnated preparations, extraordinarily broad at the basis, still broader slightly above the basis, and then gradually tapering and acute, like stilettos. Differences in the effects obtained by the two methods are most evidently due to the fact that while the spikes

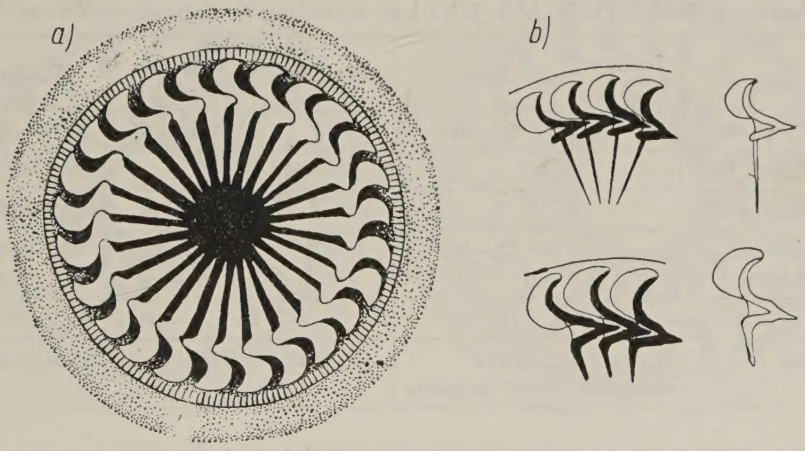

Fig. 1. a — *Trichodina pediculus* (O.F.M.) Ehrbg. — the adhesive disk. $AgNO_3$, × 1200; b — above — the denticles of *T. pediculus*, below — the denticles of *T. domerguei*. Iron-haem., × 1200.

are indeed very broad in the plane of the adhesive disk and very slender in the body's dorso-ventral direction, I. H. stains merely the somewhat thicker axial part of the spike. In living specimens, especially when examined in phase-contrast illumination, the spikes appear in fact broad; the same may be noted in some of the photographs by Canella, 1954 (Phot. 188). Another striking characterictic of the spikes is their extraordinary length; in spite of the notable diameter of the denticulate ring, they extend almost to the middle of the adhesive disk, unlike in other *Trichodina* species. In silver impregnated preparations, adhesive disk's small central area free from spikes, is equally dark as the spaces between the spikes [wherein *T. pediculus* (O. F. M.) Ehrbg. conspicuously differs from *T. domerguei* (Wall.)]. The peripheral zone of the ad-

hesive disk is striated (striated band) at a ratio of 7—8 radial striae per one denticle.

The number of denticles varies in my material between 22 and 27, usually 25, in a specimen. Diameter of the adhesive disk: 27.5——47.5 μ, average 37.5 μ; diameter of denticulate ring: 15—35 μ, average 25 μ; length of hooks, measured from the centre of the denticle: 3.5—5 μ; length of spikes (rays): 7.5—11 μ. A characteristic feature is the 1 : 2 ratio between the length of hooks and length of spikes.

Table I

Trichodina pediculus (O. F. M.) Ehrbg. according to data of various authors

	James--Clark	Zick	Wetzel	Šramek-Hušek	Raabe
Body Ø μ		50—70		45—75	35—60
Adh.disk Ø μ			50—70		27.5—47.5
Dent.ring Ø μ				22—35	15—35
No. of denticles		24—36		16—28	22—27
No.of striae		10—11		8—10	7—8
Hosts	*H.fusca* *H.viridis*	*„Hydra"* *Bufo* tadpoles	*„Hydra"*	*H. vulgaris*	*P. oligactis*

As compared to other species, a striking fact revealed by the numerical data relating to my material — and apparently to that of other authors as well — is the relatively large diameter of the denticulate ring, and especially of the nucleus, in comparison to the diameter of the adhesive disk (the ratios are 7.5 : 10 : 10), as well as the exceptional length of the introrse spikes in comparison to the extrorse short hooks: the 1 : 2 ratio, referred to before, differs very notably from analogical ratios for other species — usually larger than 1. The shape of the hooks and spikes of the denticulate ring is obviously essential as well.

My material came from *Pelmatohydra oligactis* from the vicinity of Warszawa.

Trichodina domerguei (Wallengren, 1897) f. *latispina* Dogiel, 1940, as the typical form of the species

Urceolariidae cylindrical in shape, occasionally medially constricted, but only slightly so. Diameter of body: 40—70 μ. Adoral

spiral complete, describes an arc of slightly more than 360° (about 400°) and 35—50 μ in diameter, and leads to the peristomal infundibulum. Nuclear apparatus: macronucleus sausage-like, describes an arc of roughly 330° and is 15—22 μ in diameter; micronucleus in a slight concavity, close to one of the ends of the macronucleus.

The denticulate ring consists of denticles having long, curbed and slightly pointed (rather even rounded) extrorse hooks, and moderately long introrse spikes (rays), slightly bent in the same di-

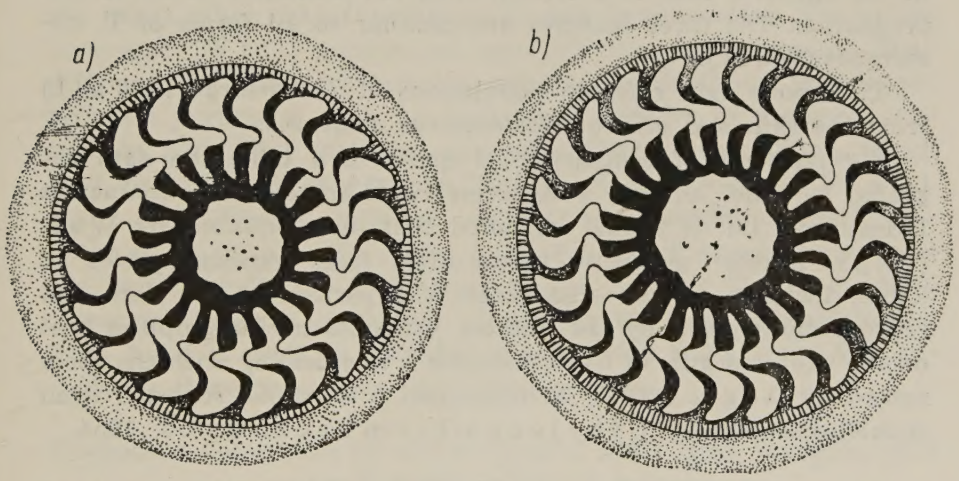

Fig. 2. a — *Trichodina domerguei* (W a l l.) f. *latispina* D o g. from *Gasterosteus aculeatus* — the adhesive disk. $AgNO_3$, × 1200; b — *Trichodina domerguei* (W a l l.) f. *latispina* D o g. from *Nerophis ophidion* — the adhesive disk. $AgNO_3$, × 1200.

rection as the hooks. Similarly to the latter, the spikes stain fairly well with iron haematoxylin. The spikes do not extend far into the central area of the adhesive disk and do not cover its bottom. This central area of the adhesive disk is in silver-nitrate impregnated preparations bright, unstained, and has a distinct dark outer zone, almost reached by the introrse spikes. This character appears to be specific for *T. domerguei* (W a l l.) in general, and is especially conspicuous in the form of *Gasterosteidae*. The peripheral zone of the adhesive disk is striated (striated band), at a ratio of 8—10 frequently pair-wise arranged radial striae per one denticle.

The number of denticles varies between 20 and 34, usually about 24; diameter of adhesive disk: 35—60 μ, average 45 μ; diameter of the denticulate ring: 20—40 μ, average 30 μ; length of

hooks, measured from the centre of the denticle: 5—9 μ; length of spikes: 5—8 μ. The ratio of length of hooks and spikes is 1 : 1, or slightly above.

In comparison to the data relating to *T. pediculus* (O. F. M.) Ehrbg., striking features are: a) relatively small diameter of the denticulate ring and macronucleus in relation to the diameter of the adhesive disk, the ratio being 6.5 : 8 : 10; b) the ratio between the length of the hooks and that of spikes, and c) presence in the adhesive disk of a central field not amenable to silver impregnation. The three features are peculiar to all forms of *T. domerguei* (Wall.).

The above data refer to populations of *T. domerguei* (Wall.) from the skin and gills of *Gasterosteus aculeatus*.

For purposes of comparison, I quote in a table the data reported by other authors with reference to some of the characters I described, but it should be noted that data reported by Wallengren refer generally to parasites from various species of fishes, inclusive of the stickleback. Comparison of the data and reproductions given by the authors warrants my assumption that on the skin and gills of *Gasterosteidae* I was dealing with the form named by Dogiel, 1940, *T. domerguei* f. *latispina*, reported from sticklebacks also by Stryjecka-Trembaczowska, 1954.

Trichodina domerguei (Wall.) from *Gasterosteidae*

	Quennerstedt	Wallengr. (various fishes)	Dogiel	Stryjecka-Trembaczowska	Poljansky	Raabe
Body Ø μ	60		56—66	42—76	47—54	40—70
Adh. disk Ø μ		23—56		37—56		35—60
Dent. ring Ø μ		17—51.5	25—28	26—37	27—33	20—40
No. of denticles	16—26	19—49	20—29	27—32	26—33	20—34
No. of striae					8—10	8—10

Furthermore, Stryjecka-Trembaczowska, 1940, and I, on the strength of my present investigations, are agreed that an identical form occurs on the gills of *Nerophis ophidion* from the Baltic. Identity of populations from *Gasterosteus aculeatus* with those from *Nerophis ophidion* is so precise that it is impossible to distinguish from one another either individual specimens or (statistically) populations from the two species of hosts. Possible differ-

ences between populations from *Gasterosteus* and *Nerophis* do not exceed those between populations from different *Gasterosteus* specimens. Merely the striae of the striated band are usually slightly more densely arranged in populations from *Nerophis,* and the ratio being as a rule 10 per 1 denticle. On the other species of *Syngnathidae* from the Baltic, viz., on *Siphonostoma typhle,* I never came across *Trichodina,* although I investigated roughly 100 specimens.

Here, I should like to emphasize that on fresh-water as well as sea fishes other than *Gasterosteidae* and *Syngnathidae, Trichodina domerguei* (W a l l.) populations have different characteristics. They differ in the size of specimens, number of denticles, proportions between particular parts of body, and number of striae on the striated band. For instance, entirely different populations, which may be regarded as discrete "forms" of *T. domerguei* (W a l l.), occur on *Carassius carassius, Esox lucius, Scardinius erythrophthalmus* of fresh-water fishes, and, e.g., on *Pleuronectidae* from the Baltic, or *Mullus barbatus* from the Adriatic (R a a b e, 1958), of marine fishes. Coincidence of populations from *Gasterosteidae,* from fresh as well as brackish waters, with those from *Syngnathidae* is therefore all the more characteristic.

Trichodina domerguei (W a l l e n g r e n, 1897) from the gills, skin and oral cavity of *Anura* tadpoles

In the course of my investigations I had in hand ample *Trichodina* material from the gills, skin and oral cavity of tadpoles of various *Anura* especially of *Rana terrestris* and *Bufo bufo* from the environments of Warszawa. The populations I investigated corresponded to one another completely and represented beyond any doubt a form identical with *T. domerguei* (W a l l.). Populations from the tadpoles I had in hand corresponded most accurately to *T. domerguei* (Wa l l.) f. *latispina* D o g i e l, 1940, described above.

Therefore, I shall refrain from repeating the entire description given for the forms from *Gasterosteus,* which perfectly fits the forms from tadpoles, and I shall quote merely some numerical data.

The number of denticles varies between 20 and 28, usually 24 or 25. Diameter of the adhesive disk: 36 : 61 μ, average 48 μ; diameter of the denticulate ring: 17.5—40 μ, average 30 μ; length

of hooks, measured from the centre of the denticle: 6.5—7.5 μ; length of spikes (rays): 5—7 μ. The ratio of the length of hooks of the adhesive disk resists silver-nitrate impregnation and has to the length of spikes 1 : 1 or slightly more. The central area an outer dark zone; the number of striate in the striated band is usually 8, less frequently 9 or 10, per one denticle.

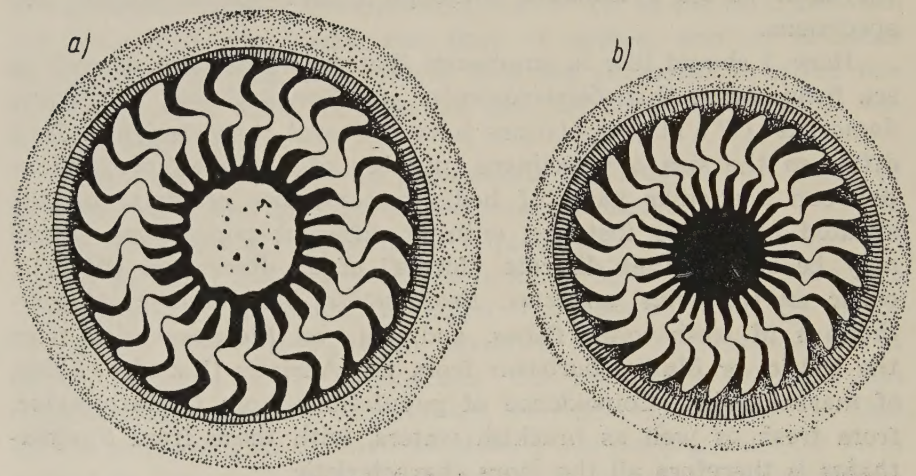

Fig. 3. a — *Trichodina domerguei* (Wall.) f. *latispina* Dog. from *Bufo bufo* tadpoles — the adhesive disk. $AgNO_3$, × 1200; b — *Trichodina urinicola* Fulton from the urinary bladder of *Triturus vulgaris* — the adhesive disk. $AgNO_3$, × 1200.

Differences between populations from the tail, skin and oral cavity of *Bufo bufo* tadpoles, and tail of *Rana terrestris* tadpoles, are entirely insignificant and do not exceed those existing between populations, for instance, from the skin of several tadpoles of the given *Anura* species.

General shape, biometrical data, identity of the structure of the denticulate ring, and complete identity of the argentophile structures, show that the form occurring on the skin, gills and in the oral cavity of *Anura* tadpoles is the typical form of *T. domerguei*, viz., *T. domerguei* (Wallengren, 1897) f. *latispina* Dogiel, 1940. Here also, similarity is so pronounced that neither individual specimens nor populations from tadpoles can be distinguished from the parasites of *Gasterosteus* or *Nerophis*.

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Unfortunately, I was unable to extend my investigations to parasites of adult *Anura* in which — other authors claim — they occur in the urinary bladder (Fulton, 1923; Fantham, 1924; da Cunha, 1950; Fauré-Fremiet et Mugard, 1946; Canella, 1954). In spite of many and sustained attempts, I could not discover in Poland frogs infected with *Trichodina;* nor could any other research workers who dissected great numbers of frogs in various parts of Poland. This is essential, considering the fact that in numerous water bodies *Trichodina* infection of the skin of *Anura* tadpoles is extremely intensive and extensive (frequently 100%). Absence of infected adults would appear to suggest that *Trichodina domerguei* (Wall.) f. *latispina* Dogiel, 1940, fails to affect adult hosts and does not survive in them.

Furthermore, as may be gathered from descriptions given by the authors, in the urinary bladder of adult *Anura* occurs a different *Trichodina* species, although it has not been adequately described or compared with *T. domerguei* (Wall.). Descriptions of *T. urinicola* Fulton, 1923; *T. bufonis* Fantham, 1924; *T. entzi* Breitschneider, 1935; *T. vesicularum* Fauré-Fremiet, 1943 (from frogs); *T. ranae* da Cunha, 1950, are in this respect inadequate. Nevertheless, judging by various data, especially by those given by Fulton, 1923, and Fauré-Fremiet et Mugard, 1946, and by photographs by Canella, 1954 — we may suppose the forms occurring in the urinary bladder of *Anura* to be allied rather to those found in the urinary bladder of *Triturus* males, or even identical with these (especially with *T. urinicola* Fulton, 1923).

In my investigations, I have been frequently dealing with parasites from the urinary bladder of *Triturus vulgaris* males, which I defined — in agreement with other authors — as *T. urinicola* Fulton, 1923. Here, I am not concerned with a discussion of the possible synonymity of various forms described from the urinary bladder of *Anura* and *Caudata* — which will be a point dealt with in my monograph on *Urceolariidae* — and I merely wish to say that *T. urinicola* Fulton, 1923, from the urinary bladder of *Triturus vulgaris* males, is undoubtedly a discrete species differing considerably from *T. domerguei* (Wall.). The differences are:

1. Slightly smaller dimensions of the body (diameter of the adhesive disk: 30—55 μ, average 42 μ; diameter of the denticulate ring: 18—30 μ, average 25 μ), whereas denticles of the denticulate ring are more numerous, 26 to 31, usually 29.

2. Different shape of hooks and spikes (rays).

3. Argentophile central area of the adhesive disk.

4. Oblique position of the plane of the adoral spiral with reference to the plane of the adhesive disk.

The differences are illustrated best in the drawing of a silver-nitrate impregnated specimens. Judging by the descriptions given by numerous authors and by Canella's photographs, populations from the urinary bladder of *Anura* correspond generally — with regard to the characters referred to above — to the *T. urinicola* Fulton, 1923, representatives I investigated, and differ distinctly from *T. domerguei* (Wall.).

At any rate, it appears certain that *Trichodina* from the skin and gills of *Anura* tadpoles are not identical with *Trichodina* from the urinary bladder of adult frogs and correspond to *T. domerguei* (Wall.) f. *latispina* Dogiel, 1940.

The differences between *Trichodina* from juvenile and adult forms of *Anura* pose the question: what happens to the parasites of tadpoles after the metamorphosis of the host? In this respect, identity of *Trichodina* from the skin of tadpoles and from sticklebacks warrants the surmise that essential reservoirs for *T. domerguei* (Wall.) f. *latispina* Dogiel are *Gasterosteus aculeatus* and (distinctly less frequently) *Pygosteus pungitius* in fresh water, whereas *Anura* tadpoles are merely hosts to some, vernal, populations of the parasite. But here another essential question arises: what can be the vector intervening between fishes and tadpoles? This vector might be assumed to be represented by some *Copepoda* on which *Trichodina* is occasionally noted. Thus, for instance, Dogiel, 1940, mentions the presence on *Diaptomus* of *Trichodina domerguei* f. *megamicronucleata* Dogiel, specific for *Carassius carassius,* and Šramek-Hušek, 1953, described from *Diaptomus* the discrete form *T. domerguei* f. *diaptomi* Šr.-Huš. Hence, *Copepoda* might be assumed to be carriers of various forms of *T. domerguei,* consequently perhaps also of *T. domerguei* f. *latispina* Dogiel. The problem calls for more detailed investigations.

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STRESZCZENIE

W badaniach nad *Urceolariidae*, a przede wszystkim w badaniach dotyczących taksonomii i morfologii porównawczej przedstawicieli rodzaju *Trichodina*, istotną trudność i największe nieporozumienia sprawia nie dość wyraźne odgraniczenie od siebie dwu gatunków: *Trichodina pediculus* (O.F.M., 1786) Ehrbg, 1838 i *Trichodina domerguei* (Wallengr., 1897).

Dla wyjaśnienia tych nieporozumień autor sięgnął do typowych form z typowych żywicieli obu gatunków, jakimi są dla *T. pediculus* słodkowodne stułbie (*Hydra, Pelmatohydra*) zaś dla *T. domerguei* — *Gasterosteus aculeatus* i *Pygosteus pungitius* i przeprowadził nad nimi badania porównawcze przede wszystkim przy zastosowaniu metody srebrowej B. Klein'a.

W wyniku przeprowadzonych badań, autor stwierdza niespodziewanie wielkie i wyraźne różnice między *T. pediculus* (O.F.M.) Ehrbg ze stułbi, a *T. domerguei* (Wall.) z wymienionych gatunków ryb, występujące przede wszystkim w budowie tarczy czepnej i wieńca szkieletowego. Na skrzelach *Gasterosteidae* autor potwierdził występowanie *T. domerguei* f. *latispina* Dogiel, 1940, którą to formę znalazł również na skrzelach *Nerophis ophidion* z Bałtyku. Tę samą formę autor stwierdził na skórze, skrzelach i w jamie gębowej kijanek *Anura (Rana terrestris* i *Bufo bufo)*. Autor wykazał również, że *Trichodina* występujące w pęcherzu moczowym traszek należą do niewątpliwie odrębnego gatunku *T. urinicola* Fulton, 1923.

Identyczność form, występujących na *Gasterosteidae* i na kijankach żab, pozwala autorowi na przypuszczenie, że wektorem pośredniczącym między tymi żywicielami mogą być pewne *Copepoda*, na których stwierdzono różne formy *Trichodina*.

Sądząc, że wyjaśnienie odrębności *T. pediculus* (O.F.M.) Ehrbg i *T. domerguei* (Wall.) powinno przyczynić się do zakończenia nieporozumień na temat ich ewentualnej synonimizacji i do lepszego formułowania diagnoz nowych form, autor podaje dokładne charakterystyki zbadanych gatunków.